SUBJECT: ***Proposed*** **Action Plan for the Geographical Delineation Fish Tissue and Sediment Mercury Contamination, Great Dismal Swamp – Lake Drummond, Chesapeake – Suffolk Cities, VA**

TO: Bob Burnley, Director

FROM: Larry Lawson, Director Division of Water Program Coordination

DATE: February 6, 2004

COPIES: F. Daniel, R. Everton, A. Pollock, V. Thomson, F. Campbell, J. Gregory, R. Browder, A. Barron, G. Darkwah

A: Objective:

The intent of this project is to determine the geographical extent and magnitude of the contamination of fish by mercury in the Great Dismal Swamp-Lake Drummond, Chesapeake – Suffolk Cities, VA. The Virginia Department of Health (VDH) issued a mercury fish consumption advisory in an October 29, 2003 press release based on fish tissue data collected by the Virginia Department of Environmental Quality (DEQ) in 2002 from the Great Dismal Canal. The press release recommended eating no more than two meals per month of chain pickerel and bowfin taken from the problem area. The focus of this project is to provide additional data at the request of VDH so that they have the necessary information to expand or contract the advisory boundaries and species included in the advisory. The study area includes the Great Dismal Swamp, from the Dismal Canal locks at Deep Creek and downstream to the Virginia-North Carolina state line. Sediment samples collected may help bracket the boundary limits of mercury contamination within the study area.

B: Justification:

First, the concentrations of mercury in composite samples of edible fillets of fish tissue collected in 2002 by the DEQ exceeded the VDH level of concern of 0.5 parts per million (ppm) or higher for mercury, a specific toxic contaminant. Chain pickerel and bowfin samples from the Feeder Ditch to Lake Drummond near Arbuckle Landing site at Rt. 17 had mercury levels of 0.78 and 1.50 ppm respectively.

Second, the mercury concentrations in fish tissue samples taken from the advisory area, assessed using EPA risk assessment techniques for mercury as non-carcinogen, exceeded the Screening Value (SV) of 0.3 ppm. The SV threshold is from Table 6a of the Water Quality Assessment Guidance Manual for Y2004 305(b) Water Quality Report and 303(d) Impaired Waters List (DEQ, draft August 25, 2003).

Finally, the VDH has requested a follow up study to determine the magnitude and extent of fish contamination, and potential sources (minutes of September 24, 2003 meeting from J. Gregory-DEQ). This suggests a potential threat to human health upon which the Director may determine the need for a source assessment.

Therefore, this project is consistent with the DEQ's Toxic Contamination Source Assessment Policy (January, 2000) which describes when and how to conduct source assessments for toxic contaminants using the Virginia Environmental Emergency Response Fund (VEERF). The circumstances above represent triggers listed in that document, which indicates the need for toxic contaminants source assessment.

C: Project Structure:

The DEQ's Central Office Fish Tissue and Sediment Monitoring Program Staff will collect fish tissue and sediment samples at selected sites within the Great Dismal Swamp – Lake Drummond drainage in 2004. The tentative list of potential sites may be adjusted based on accessibility, river condition, weather, etc., (see Table 1 and Figure 1). The Virginia Institute of Marine Sciences (VIMS) and the College of William and Mary will perform biota and sediment sample analyses once VEERF funding has been approved. Funds for additional sampling may be requested in the future, pending the 2004 sample results.

Table 1: Potential 2004 Great Dismal Swamp follow up sites

DEQ site #	Stream name/location/description	Latitude	Longitude
site # 1	Dismal Swamp Feeder Ditch	N36° 35.509'	W76° 23.078'
site # 2	Dismal Swamp Lake Drummond-1	N36° 36.943'	W76° 27.706'
site # 3	Dismal Swamp Lake Drummond-2	N36° 35.326'	W76° 29.116'
site # 4	Dismal Swamp Washington Ditch	N36° 39.181'	W76° 33.613'
site # 5	Dismal Swamp Jericho Ditch	N36° 42.962'	W76° 31.717'
site # 6	Dismal Swamp East Ditch	N36° 46.122'	W76° 27.719'
site # 7	Dismal Swamp Portsmouth Ditch	N36° 45.118'	W76° 22.408'
site # 8	Dismal Swamp near Rt. 104	N36° 42.654'	W76° 21.187'

D: Safety Requirements:

General safety requirements will be followed as stated in the DEQ's Quality Assurance/Quality Control Project Plan for the Fish Tissue and Sediment Monitoring Program (August, 1998).

E: QA/QC for Field Sampling and Laboratory Analyses:

The DEQ's central office staff in standards and biological programs will perform all field sampling covered by this plan. All field quality control samples will be collected in accordance with the Agency's Quality Assurance/Quality Control Project Plan For The Fish Tissue and Sediment Monitoring Program (August, 1998). Split and replicate samples will be analyzed at a frequency of 10%. All samples collected under this plan will be analyzed by VIMS.

F: Project Scope:

The projected study schedule follows:

January 2004 – Approval of Proposed Project Plan for VEERF funding by Agency Director.

February 2004 – Draft Project Plan incorporated into the 2004 DEQ Fish Tissue and Sediment Monitoring Plan.

Summer 2004 – Collect Fish and Sediment samples (Approximately One-Week Sampling Event)

January – Febraury 2005 – Deliver samples to VIMS.

June 2005 – Receive sample results and report to VDH

June – December 2005 – Evaluate results. Identify contaminated stations sampled in 2004. Consultation with VDH. Post data on the DEQ website. Request VEERF funding and conduct further sampling as deemed necessary and dictated by findings.

G: Responsibility for Specific Study Plan Tasks:

Project Team:

Jean Gregory – WQS&BP manager fish tissue and sediment collection. Facilitates communication and coordination among VDH, and DEQ Central Office and Regional Office Staff.

Alex Barron – WQS&BP manager fish tissue and sediment collection, data analysis, and report preparation.

Rick Browder – Sample collection planning and logistics, field collections, data analysis, data management, and report preparation.

Gabriel Darkwah – WQS&BP fish tissue and sediment lab liaison, data analysis, and data management, QA/QC, website production, and report preparation.

Dr. Rob Hale – VIMS Lab Director, data QA/QC, and primary contact for samples submitted to VIMS.

Dr. Gary Rice – College of William and Mary Lab Director and data QA/QC.

Bill Hayden – DEQ Public Affairs Director. Central Office point of contact for web-targeted information. Central Office contact for reporters and press releases.

H: Costs of Implementation:

The Virginia Legislature has authorized use of the Virginia Environmental Emergency Response Fund (VEERF) for conducting the assessments described here in accordance with DEQ's Toxics Contamination Source Assessment Policy (VEERF Policy Statement 2-2001, effective 9/11/2000). Costs budgeted include sampling and analysis for samples (see Table 2).

Total Cost for sampling February, 2004 – December, 2005: **$ 10,700.00**

- **Fish Tissue and Sediment Analysis**

WQS&BP estimates $ 8,320.00 will be needed to analyze 40 fish tissue samples at $145 and 12 sediment samples at $210 including QA/QC samples in order to conduct this study as requested by VDH.

- **Incidentals**

A commitment of $2,380.00 for equipment, lodging, meals, and miscellaneous incidental travel costs for 4 member field crew and approximately four day sampling event.

Any change in the scope of work to include special contracted services or expanded sampling will require additional resources.

Table 2: Itemized Budget for Great Dismal Swamp VEERF Project

Sample Analysis: Fish Tissue Mercury , 40 samples @ $145 each.	$ 5,800
Sample Analysis: Sediment Mercury, 12 samples @ $210 each.	$ 2,520
Travel Costs: hotel, meals, equipment, and incidentals for 5 day sampling event with 4 field crew members.	$ 2,380
Total	$ 10,700

I: Products:

1. Maps with the following information
   - Monitoring locations and contaminant concentrations for fish tissue and sediments

2. Reports
   - Data to VDH
   - DEQ website and data to DEQ assessment staff
   - Plans and recommendations for further investigation

DEQ Director Approval:_____Date: _____

Fig 1: tentative Dismal Swamp 2004 Hg follow up sites